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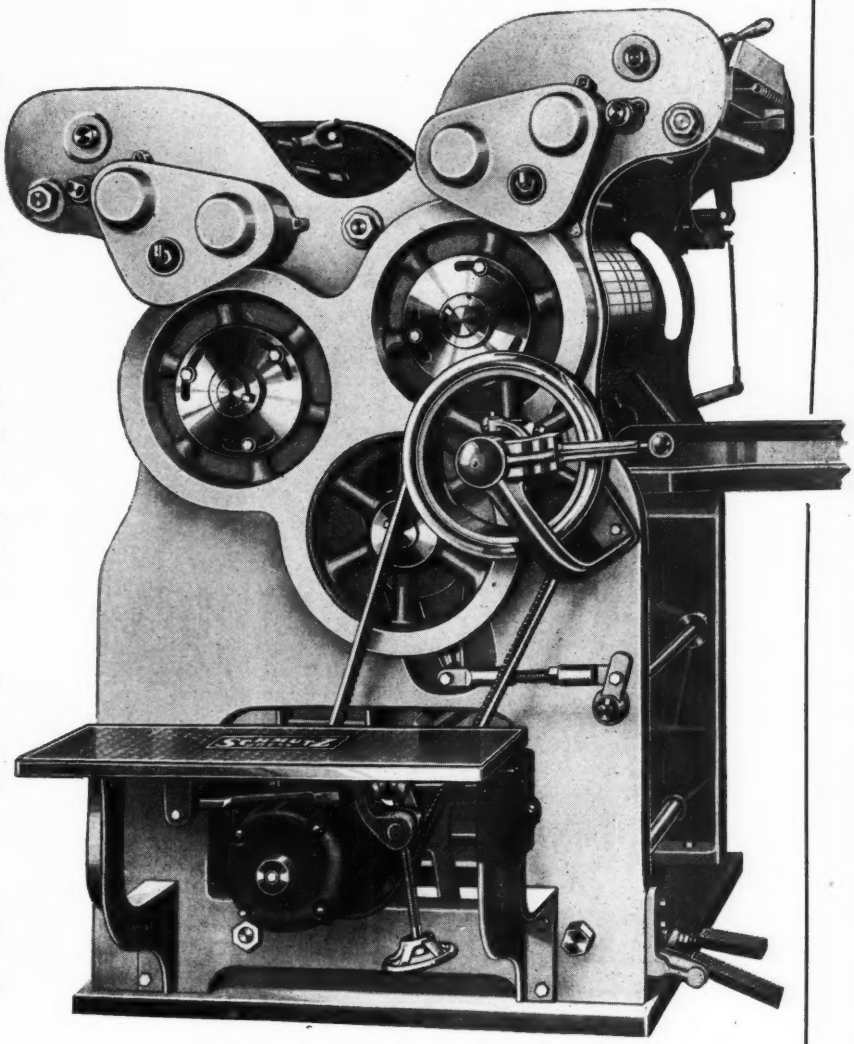

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The American FERTILIZER

Vol. 104 MAY 18, 1946 No. 10

Grow Health Into The Crop

By VINCENT SAUCHELLI

Director, Agricultural Research, The Davison Chemical Corporation

ISN'T it strange that the human race survived these thousands of year without knowing about vitamins, minerals and the rest of the present day food fads?", said a friend to me recently. "As for me, I'll eat my vitamins wth a knife, fork and spoon."

What could you say to a man with such an attitude? His remarks set me thinking about nutrition and the many valuable discoveries made by scientific workers in this field of research. You are going to share these thoughts with me in what follows. The subject is somewhat complicated and I can assure you I approach it with a considerable degree of humility.

As I see it, nutrition begins with the soil. Health—your health and mine—the health and well-being of plants and animals—the health of all living things is dependent upon a proper balancing of fertility in the good earth. Nutrition, insofar as we of today are concerned, is a result of many factors—fertilizers, mineral elements, the rotation of crops and the retention and use of rainfall. Perhaps our ancestors did not have to worry about nutrition. But I know that if you walk through any of our oldest cemeteries you cannot help noticing on the tombstones the youthful age of so many who lie buried underneath. May it not have been equally faulty nutrition that killed off, at an early age, so many of these pioneers?

Forest Soils are Poor Soils

We assume too often that, because they were virgin, the soils along the Atlantic Seaboard were all fertile when the first settlers arrived. Are we correct? We know from the history books that even the Indians had to fertilize their patch of corn: one fish per hill of corn. The great stretch of forest that covered the land misled the pioneer into thinking the soils were rich to be able to support such luxuriant growth. Soil science, however, informs us that forest soils are usually poor soils, owing to heavy rainfall. It takes abundant rains to grow trees: but, by the same token, the heavy rains for centuries before had leached out a large part of the fertile elements. The top layer of the forest soil was the only fertile zone. By contrast, the soils of the country beyond the Mississippi—the prarie soils—were the rich, unleached soils that produced abundant harvests for the early settlers, and they are only now beginning to show signs of impoverishment after a hundred years of heavy cropping.

To return to our eastern forest soils, on many of our rain-drenched, Coastal Plain soils truck crop farmers apply now as much as one ton of complete fertilizer per acre and they have to lime the soil heavily for most crops. Not only do they apply phosphorus, nitrogen, potash, and lime, but in recent years, also maganese, boron, copper, zinc and magnesium. These plant food elements are nneded to assure a successful harvest. The commercial potato grower in Maine or Long Island, or New Jersey or in the Delmarva Peninsula, could not continue in business without the application of chemical plant foods. These open, sandy soils seem

to serve merely as the physical support for the crop.

High Yields Not Enough

Up until quite recently, those of us whose job it is to provide the best chemical plant foods to the farmer so that he can make a good living at it, have emphasized the increase in yields which our materials would produce. There is nothing wrong in that. We must continue to do all we can to help the farmer maintain his heavy yields per acre in order to keep down his unit costs of production. But a new factor is now with us: namely, the ultimate consumer's interest in the quality of what is grown. This may not be ignored. Nutritional science is teaching more and more people that nutritional quality in crops is essential to health. The consumer is going to be interested more and more in food-values and less in acre-yields.

Health begins in the soil—a high quality goes with high acre yields

Poor land makes poor people, poor people make poor land

This interest should be welcomed and fostered. During the past war years many city people experienced for the first time the pleasure of eating fresh victory garden vegetables that were grown in completely fertile soil. Our soldier boys were taught the importance of well-balanced nutrition. Popular books and magazines are devoting more space to tell the story of nutrition and vigorous health. The subject has even been noticed and debated in the British House of Lords and on the floor of the Congress in Washington. It is up to us to help keep this interest alive by encouraging in every legitimate way proper soil management and the intelligent application of more fertilizers to crop soils. For it is a well-established fact that high yields go with high quality. The more productive the soil, the more likely that crops grown on such soils have more of the mineral and nutritive elements that animals and humans need for better health. So I say, our slogan should be "Grow health into the crop."

We Are What We Eat

A recent writer tried to compress into a short phrase what he had learned from a study of nutrition: "we are what we eat," he said. I like this phrase because in a way it does sum up much of our present knowledge. At least, it seems to be true insofar as the physical level is concerned. Some instances will be noted which bear this out.

Early this year we had a visitor from New Zealand. He told us about grazing land which up until ten years ago could have been bought for less than $5.00 per acre; today, that same land cannot be bought for $100.00 per acre. The difference: about 30 ounces of cobalt. Sheep and cattle that grazed on the untreated land suffered from so-called "nutritional anemia." A tiny amount of cobalt added either to the forage or to the pasture land corrects the cause. It is now recognized that iron, copper, and cobalt are linked together in anemias because all three are involved in the making of blood. Since the initial scientific work on cobalt in Australia and New Zealand our American investigators have also found deficiencies of cobalt and iron in several parts of our own country. Known cobalt deficient areas exist in Florida, New Hampshire, Michigan, and Texas. In the deficient areas of Florida the lack of cobalt, iron, and copper in the soil has been clearly traced as the cause of anemias among many local

children. Dr. Ouida Abbot, the Florida authority whose name is closely associated with nutritional anemia investigations in her state, has reported on the hundreds of "chalky-faced, dull-looking, listless boys and girls" she used to see as she travelled on her duties from one district to another. People down there used to think the children were victims of hook-worm. But, as was discovered later, malnutrition and not hook-worm was pulling those children down. Dr. Abbot in time was able to demonstrate that a very close correlation existed between these anemic children, the "salt-sickness" of cattle, and the deficiency of cobalt, iron, and copper in the local soil

Maximum yields per acre, but also maximum nutritional quality

on which food for beast and humans was grown. "Iron-pills," comprising dried leafy vegetables grown in mineral-rich soils, when fed to the sick children, restored them to bouncing, normal health.

Hungry plants, hungry animals, hungry humans. Another way to put is is "poor land makes poor people, poor people make poor land, the people get poorer and the soil gets still poorer."

"There is nothing new under the sun," is the old saying. A recent article on this subject of soil fertility and health by Dr. J. G. Archibald of the Massachusetts Experiment Station, refers to a 300 year old treatise written by Cammerarius, a German, in which he described a mineral hunger prevalent at that time among the cattle in the Black Forest. He also quotes the following from Sprengel, another writer of over 100 years ago: "red clover . . . grown upon a marly soil, always contains more calcium, phosphorus, and sulphur that red clover grown upon a loamy soil. Since calcium, phosphorus and sulphur are essential for the growth of the animal body, it is perfectly evident . . . why clover from a marly soil is more nutritious than clover from a loamy soil."

Nutrition Quality a Must

Plants furnish directly nearly 100 per cent of the food consumed by animals and about 60 per cent of the food in the diet of humans. Because of man's dependence upon animals for a portion of his nutrition, plants also indirectly affect man's diet by influencing the quality of animal products.

In the course of agricultural developments we have bred livestodck for higher production, and to higher standards of growth, body development, and yields. Meanwhile, owing to erosion and other destructive practices fully emphasized by our soil conservation authorities, the quality of the nation's food supply kept growing inferior. Fortunately, before it was too late, the situation was appraised by the more alert and far-sighted farmers, fertilizer manufacturers, food processors and agricultural officials. Soil deficiencies having been recognized, it was relatively easy to correct them through properly compounded chemical fertilizers and good soil management. Nutritional science has taught more people to appreciate the importance of the protective foods—fruits and vegetables. But over-commercialization has placed too much importance on yields and market quality; consequently, attractive color for eye-appeal, ability to withstand long transportation have too often been the main objectives. These things are all right in themselves, of course, since it is necessary to create sales in the market place. But, again, I believe we should be honest with ourselves and place the major emphasis where it belongs, namely, on the development of as high a percentage as possible of the essential nutrients which are deficient in our diets. Let us get the highest yields; but let us not forget to get a maximum content of nutrients as well as tons or bushels per acre. And the only proven method to reach this goal is to raise the fertility level of the soils on which our food crops are grown.

(Continued on page 28)

April Tag Sales

Fertilizer tax tag sales in April, 1946, in the 16 reporting States were equivalent to 925,000 tons, or 2 per cent more than for April, 1945, according to The National Fertilizer Association. April sales in the South declined slightly but this decline was more than offset by the 36 per cent rise shown in the Midwest when compared with the sales in April, 1945. Declines from last year were reported in 8 of the 16 States.

Tag sales in the first four months of this year, January through April, were equivalent to 5,141,000 tons in the 16 reporting States, representing an increase of 445,000 tons, or 9 per cent, over the corresponding period of 1945. A small decline from last year was reported by South Carolina and a negligible drop occurred in Georgia.

The 10 months sales, July through April, in 1945–46 were 72 per cent higher than they were in the five-year average before the War (1934–35 to 1938–39) and have been increasing each year since that period, reaching a new high level this year. July–April sales this year were 10 per cent higher than the same period a year ago and 17 per cent higher than two years ago.

The fertilizer industry has been making every effort to step-up the production of fertilizer to even higher levels than had been reached before in order to help the farmers reach their higher food goals. Production in 1945 rose to a new high peak of 13,200,000 tons and until the serious curtailment of one of the basic fertilizer materials, ammonium sulphate, caused by the steel strike, and the even more disrupting coal strike, indications were that the industry could reach their high goals.

With the sharp reduction of production of ammonium sulphate and perhaps closing of the synthetic nitrogen fixation plants, and the difficulties of the fertilizer industry in securing materials, transportation, and labor, it is becoming increasingly important to remember that the scale of tax is merely an *indicator* of fertilizer sales.

FERTILIZER TAX TAG SALES — July through April

	1945–46	1944–45	1943–44
11 Southern States	6,270,033	5,828,956	5,580,387
5 Midwestern States	1,298,641	1,035,279	867,305
Total–16 States.	7,568,674	6,864,235	6,447,692

FERTILIZER TAX TAG SALES

COMPILED BY THE NATIONAL FERTILIZER ASSOCIATION

STATE	APRIL 1946 Tons	APRIL 1945 Tons	APRIL 1944 Tons	APRIL % of 1945	JANUARY–APRIL 1946 Tons	JANUARY–APRIL 1945 Tons	JANUARY–APRIL 1944 Tons
Virginia	83,857	63,023	62,471	120	372,320	311,088	279,333
North Carolina	205,133	219,771	180,532	106	1,100,330	1,041,909	939,072
South Carolina	70,050	95,890	89,003	98	592,560	601,868	576,031
Georgia	130,229	138,576	102,224	99.9	817,264	817,685	772,123
Florida	71,666	55,830	52,104	113	373,150	330,412	318,826
Alabama	78,600	93,150	62,000	104	585,650	564,150	531,250
Tennessee	18,803	54,400	51,133	102	177,894	173,650	163,443
Arkansas	27,250	9,950	15,050	124	99,200	79,900	86,983
Louisiana	23,721	24,100	13,685	103	115,531	112,186	124,085
Texas	35,289	22,910	30,940	139	170,841	123,035	123,576
Oklahoma	2,900	3,000	180	164	23,998	14,662	10,551
Total South	747,498	780,600	659,322	106	4,428,738	4,170,545	3,925,273
Indiana	35,123	26,836	26,507	140	202,740	144,448	149,737
Illinois	46,230	37,500	10,580	132	149,238	113,425	74,130
Kentucky	48,293	54,013	38,025	116	199,231	171,458	141,574
Missouri	43,579	10,880	5,676	176	146,182	83,017	65,865
Kansas	4,153	950	2,620	111	15,362	13,865	14,476
Total Midwest	177,378	130,179	83,408	135	712,753	526,213	445,782
Grand Total	924,876	910,779	742,730	109	5,141,491	4,696,758	4,371,055

La Guardia Urges Greater Fertilizer Exports

In an address to the National Press Club in Washington on May 10th, Director-General La Guardia of UNRRA stressed the need of immediate supplies of fertilizers in some parts of the world to avoid famine during the present year. He stated that if China could obtain 50,000 tons of sulphate of ammonia now, it could supply itself with desperately needed rice this year. In commenting on recent shipments of 6,000 tons of fertilizers by UNRRA, he regretted that it could not have been 150,000 tons.

The energetic Director took a realistic view of the situation, however, as he realized that such supplies of available fertilizers simply do not exist. Every one is doing his best to help solve the problem. Director of Reconversion Snyder is doing it; the Army is working on the problem; so is the Department of Agriculture. But time is getting too short to do any good during the present crop year. It is encouraging to note that the new Director realizes the importance of fertilizers in the world food situation and that he will use all his resources to obtain increased production for world use.

World Allocations of Fertilizer Materials

In view of the prospective world shortage of fertilizer materials in 1946–47, the Committee on Fertilizers, CFB, at its meeting in Washington, April 25th, made special arrangements for reviewing the situations for every country prior to the allocation meetings which started on May 13th. All claimant countries have been asked to submit production estimates and fertilizer requirements for the 12 months starting July 1, 1946. It is hoped that final recommendations for the tonnages of nitrogen, phosphates and potash to be supplied to such countries will be made to the Combined Food Board by June 1, 1946. Preliminary surveys indicate a pronounced demand for nitrogen particularly, far beyond any current world producing capacity.

Several allocations were made to wind up the 1945–46 season. Among them were 5,000 additional tons of sulphate of ammonia from the United Kingdom to China, Malaya, and Hong Kong, for shipment before July 1; 25,000 tons of ammonium nitrate from the United Kingdom to UNRRA countries, French North Africa, and the United States and United Kingdom zones in Germany. Potash supplies available from the United States and the United Kingdom zones in Germany for shipment prior to July 1 were allocated to various European countries. Phosphate rock from North Africa was allocated to Australia to help the wheat production campaign in that country and to Sweden, Turkey and Japan.

The Combined Food Board confirmed the continuation of the Committe on Fertilizers for the remainder of the year. Up to date supplies of the order of 40 million tons of all fertilizer materials have been allocated during 1945–46.

World Potato Production Drops

The world production of potatoes harvested in the 1945–46 season is tentatively estimated by the U. S. Department of Agriculture's Office of Foreign Agricultural Relations at 11 per cent smaller than in 1944–45. The decline is attributed largely to smaller harvested acerage. Yields per acre also were below average.

The total world output for 1945–46 is placed at 6,459 million bushels compared with 7,298 millions in 1944–45, and a 1935–39 average of 8,127 million. World acreage is estimated at 45.4 million acres in 1945–46, compared with 49.3 million harvested in 1944–45, and a 1935–39 average of 52.3 million. Most of the acreage decreased occurred in Europe (excluding the Soviet Union), particularly in Germany, France and Poland. The Soviet Unions' acreage increased, but it remains substantially below the pre-war average.

North America's potato production in 1945 rose to 499 million bushels from 479 million the year before. The United States and Mexico produced large crops, but Canada's harvest was small, because of very low yields.

Production in Europe (excluding the Soviet Union), is placed at 3,880 million bushels in 1945, compared with 4,800 million in 1944, and a 1935–39 average of 5,340 million. Largest decreases were in Belgium, the Netherlands, France, Spain, Italy, Germany, Austria, Hungary, Rumania, Bulgaria, Poland and Lithuania because of drought and other factors.

There was a production increase of 78 million bushels, or 5 per cent in potato production in the Soviet Union in 1945 compared with 1944, but the Soviet crop was 333 million bushels or 16 per cent smaller than the 1935–39 average.

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Farmers Produce Without Reckless Plow-up

United States farmers are proving what the U. S. Department of Agriculture points out is their ability to produce for war and famine relief without recklessly plowing up land to the sacrifice of the country's soil resources.

During the recent war years, only 2 to 3 million acres of land unsuited to cultivation are estimated to have been broken up. Yet American farmers have produced record grain and other crops one year after another. Favorable weather, improved crop strains, better disease and insect control, modern machine methods of farming, and better land use through soil and water conservation practices are all credited with having aided in achieving the record results.

The necessity for maximum production of food fiber and oil crops during the past few years is reported by Soil Conservation Service observers to have put heavy perssure on the land and to have resulted in some inevitable damage. The net harm, however, has been small so far in comparison to the damage in the World War I period. During and immediately after that war, beginning with 1915, the plow-up amounted to about 30 million acres. A large part of this was Great Plains grassland, and much of it was land unsuited to growing cultivated crops. The "dust bowl" of the 1930's has been charged largely to that plow-up.

A recent Soil Conservation Service survey showed, for example, that practices like contour cultivation, strip cropping, soil-improving crop rotations, pasture improvement and range conservation, improved irrigation and drainage substantially boosted per-acre yields from land so treated. This is the tip-off, the conservationists say, on how maximum needed production can be realized safely on the good land without wasting premium labor, machinery, seed and fertilizer in trying to "mine" low-yielding lands that are more productive and profitable in grass or tree crops.

Double importance of this conservation development in American agriculture is seen in prospective demands upon the country's farmland even after the present famine emergency has passed. Notable among these demands from the domestic standpoint are the food requirements of a population to reach between 156 and 170 million people by 1970

Most recent Department suggestions developed in cooperation with the States, are for 418 million acres of cropland by about 1950, or 8-½ million below the 1935–39 average, assuming prosperity conditions and desirable changes in practices. Improved agricultural methods, including conservation practices, account for the allowable decrease. If full advantage were taken of all technological improvements, actual cropland in 1950 possible could drop to 330 million acres.

Approximately 43 million acres now in cultivated crops should be shifted to safer land use, that is, into grass and tree crops, according to Soil Conservation Service findings. However, offsetting acreages of better class lands which are not now in cultivation but which could be cropped safely by using good management and conservation practices, if need arises, have been reported in SCS surveys.

The most effective check on any runaway plow-up or other wholesale farmland abuse is seen in soil conservation districts, organized and managed by farmers themselves under state enabling laws. Through them, the farmers themselves develop their conservation programs as groups and draw upon federal, state or local sources or techincal or other assistance in carrying them out. To date more than 1,500 such districts have been voted in 46 states, taking in more than half the farms of the country and more than 800 million acres. New districts are being formed at the rate of 15 to 20 each month.

N. F. A. Survey Shows Greater Returns from Fertilizer Use

The results of the Third National Fertilizer Practice Survey, made in 1944 by the National Fertilizer Association, have been published in the current issue of *The Fertilizer Review*. A comparison with previous surveys made in 1928 and 1938 would indicate that the farmer is learning to make better use of his fertilizers in obtaining greater increases of yield. For example, 6,406 cotton growers showed an increase of 232 pounds per acre through the use of fertilizer, compared with 208 pounds as shown in the 1938 survey. Similarly, fertilizer produced an additional 11 bushels of wheat, compared with 9 bushels in 1938.

The survey reported 28,922 interviews obtained by representatives of fertilizer companies, and through vocational agriculture schools. The results were tabulated and summarized for each state giving the results for each of the principle crops grown in that state. The following table gives the national summary for five of the principal crops.

ESTIMATED YIELD WITHOUT AND WITH FERTILIZER

NATIONAL SUMMARY

Crop	No. of Farmers Est'ing	Unit	Estimated Yields Without Fertilizer	With Fertilizer	Increase
Cotton–					
1938.....	10,123	Lbs.	134	342	208
1944.....	6,406	Lbs.	186	418	232
Corn–					
1938.....	17,969	Bu.	20	34	14
1944.....	18,063	Bu.	29	44	15
Potatoes–					
1938.....	2,767	Bu.	88	205	117
1944.....	3,356	Bu.	95	203	109
Wheat–					
1938.....	7,545	Bu.	13	22	9
1944.....	8,872	Bu.	15	26	11
Tobacco–					
1938.....	4,811	Lbs.	453	1,076	623
1944.....	2,699	Lbs.	600	1,223	623

Barrett Appoints Agronomists for Virginia and the Carolinas

The Barrett Division of Allied Chemical & Dye Corporation has announced that Robert H. Garrison, following his recent release from the armed service, rejoined its ranks as agronomist for South Carolina. He will be attached to the Company's district office located in the Carolina Life Building, Columbia, S. C.

Mr. Garrison was called to active duty in February, 1941, at which time he was serving as agriculturist for Barrett in South Carolina. He entered the army as captain, having previously been commissioned in the Reserve Officers Training Corps. From February 11, 1941, to August 19, 1943, Mr. Garrison was attached to the Infantry School at Fort Benning, Georgia. He was then tansferred to the Infantry Replacement Training Center at Camp Blanding, Florida, where he served until his release from the armed service in January, 1946. In June, 1941, Mr. Garrison was promoted to major, and in November, 1942, to lieutenant colonel. On being released from the Army, he was commissioned colonel.

Mr. Garrison graduated from Clemson College in the class of 1927. Following graduation and before coming with Barrett, he

taught vocational agriculture in Orangeburg, South Carolina, and served as supervisor of vocational teachers in Calhoun, Orangeburg, and Bamburg Counties.

The Barrett Division has also announced the appointment of Borden S. Chronister as Company agronomist for the states of North Carolina and Virginia. His address will be 208 Chamberlain Street, Raleigh, North Carolina.

Mr. Chronister was called to active duty in April, 1942, at which time he was enrolled as a graduate student at North Carolina State College. Inducted as a private, promotion to the rank of captain soon followed. During the period from 1943 to 1945, he served overseas, being stationed in Italy. While in the service, Mr. Chronister received the Bronze Star Medal, the Presidential Unit Citation, and eleven Battle Stars. Following his release from the Army in November, 1945, Mr. Chronister returned to North Carolina State College to continue his graduate studies, and to serve as a research assistant in agronomy.

A native of Arkansas, Mr. Chronister received the B.A. degree at Lambuth College, Jackson, Tennessee. Requirements for the degree of Master of Science were completed at the University of Tennessee in Knoxville, the degree being conferred in 1941. Shortly thereafter, Mr. Chronister reported to North Carolina State College to pursue further graduate study.

International Reports Sales Increase

The worldwide drive for increased food production is being reflected in the comparative sales figures of the International Minerals and Chemicals Corporation for the quarter ending March 31, 1946, which show substantial gains over the same period last year.

Louis Ware, president of the corporation, reported that sales for the first quarter in 1946 totaled $12,814,993, representing an increase of 17.9 per cent over the same quarter last year which totaled $10,867,003. Similarly, for the nine-month period ending March 31, 1946, the company sales of $24,092,326 compared with $20,843,122 over the same period last year, representing an increase of 15.6 per cent.

March Superphosphate Figures

Production of superphosphate during March totaled 716,572 tons, figured on the basis of 18 per cent A. P. A., according to the statistics of the U. S. Bureau of Census. This compares with 702,564 tons in February and is a decided increase over 642,796 tons produced in March, 1945. During the month, shipments and amounts used in reporting plants came to 916,249 tons, which caused a decrease in stocks on hand from 847,772 tons on February 28th to 672,289 tons on March 31st. Figures for the different types of superphosphate are as follows:

	Normal 18% A. P. A.	Concentrated 45% A. P. A.	Base Goods 18% A. P. A.
PRODUCTION			
March, 1946.....	647,919	25,408	5,133
February, 1946...	634,332	25,694	3,997
March, 1945.....	587,467	20,861	3,176
SHIPMENTS AND USED IN REPORTING PLANTS			
March, 1946.....	839,401	25,615	12,810
February, 1946...	713,726	27,902	10,257
March, 1945.....	661,891	24,237	9,040
STOCKS ON HAND			
March 31, 1946...	578,608	35,831	4,103
Feb. 28, 1946....	750,642	34,752	10,250
March 31, 1945...	812,236	18,741	6,380

BRADLEY & BAKER

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FERTILIZER MATERIALS MARKET

NEW YORK

Coal Strike and Resulting Freight Embargo Seriously Cripple Fertilizer Production. Record Output in 1945 with Increase Expected in 1946. Possible Rise in Sulphate of Ammonia Price Rumored. No Improvement in Organics Situation. Phosphate Rock Market Tight

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, May 11, 1946.

The major factor affecting the fertilizer materials market during the past week has, of course, been the prolonged coal miners' strike and the resulting government order which places an embargo on rail shipments of materials. At this writing, fertilizers are included under the limiting order, but in view of the important part being played by fertilizer in the production of food throughout the world pressure is being brought to bear to have fertilizer materials exempted from the general rail embargo.

There is no question but that fertilizer production for American farms is being serously reduced as a result of the present coal strike, and this particularly true with regard to the output of ammonium sulphate, as a continuance of the strike will force a complete shutdown of coke furnaces in the near future. It is estimated that the recent steel strike retarded the production of ammonium sulphate by 124,000 tons, but it is not yet possible to determine what further reduction has been brought about by the coal situation. Nitrogen obtained from fixation plants will be similarly affected.

In spite of various difficulties encountered, American farmers received during 1945 the record amount of 13 million tons of mixed fertilizer, and it is felt that this level will probably be exceeded during 1946.

Export demand continues very heavy, but remains unsatisfied except for material formerly allocated by the Conbined Food Board. There continues to be an absolute lack of foreign offerings of any fertilizer materials.

Sulphate of Ammonia

The general critical situation in this market is aggravated by uncertainty as to future supplies and probable price schedule. There have been rumors in the trade that the price of ammonium sulphate would be increased by $5 per ton, but there has been no official announcment from OPA as yet, although it is known that this matter is under discussion at the present time. Uncertainty as to the future is the predominant tone in this market today.

Nitrate of Soda

Supplies in this area continue to be adequate, with imports of the Chilean material arriving as scheduled. Additional demand from contractors and others remains unfilled.

Organic Materials

It is hoped that the higher ceilings recently obtained by the packing houses will result in the availability of additional by-products, but any increased production will probably be taken by the feed trade at prices prohibitive to the fertilizer manufacturer. New offerings of these materials, both domestic and foregn, are absolutely non-existent, and no relief in the supply can be foreseen for the new year. Some supplies of cottonseed and castor meal formerly imported to this country from South and Central America are now being consumed locally, and are not being offered to this market.

Superphosphate

The general outlook for the next six months indicates an increasingly tight position, due to the inability of acidulators to obtain additional amounts of phosphate rock. Production facilities can only take care of a portion of the tremendously increased demand for triple superphosphate.

Phosphate Rock

The United States Department of Commerce reports that increased production of phosphate rock in Tunisia promises to relieve considerable current world shortages of phosphate fertilizers. War damage to the North African mines and port facilties have been, steadily repaired and exports have shown a steady increase during the past year's opera-

Corn, Wheat, Tobacco, Cotton — every growing plant takes plant food out of the soil

Literally speaking, each hill of corn, each clump of wheat, each tobacco or cotton plant removes rich topsoil from the acres under cultivation. Unless the farmer puts back into his soil the plant food his crops take out of it, his land becomes unproductive.

With the overproduction necessary during the war years and a lack of the time required for the proper rotation of crops, the farmer has found the true value of commercial fertilizer to maintain the plant food his crops require. This knowledge of fertilizer value and the tremendous food program ahead indicates an increased demand for quality fertilizers in the post-war era.

• • •

As the demand for fertilizers increases, the demand for Raymond Multi-Wall Fertilizer Shipping Sacks grows. These tough, strong, dependable Shipping Sacks have won the preference of leading fertilizer packers and shippers everywhere.

Raymond Multi-Wall Paper Shipping Sacks are CUSTOM BUILT to meet the special requirements of the fertilizer industry. They are manufactured in various sizes and strengths, with valve or open mouth, sewn or pasted, printed or plain. Brands or trade names are printed in brilliant, fade-proof colors.

THE RAYMOND BAG COMPANY

MIDDLETOWN, OHIO

tions. Total exports of Tunisian rock during 1945 amounted to 604,000 tons, all of which went to the European market.

Potash

This is perhaps the brightest picture in the fertilizer materials market as domestic production is generally meeting this country's requirements, and the rapid rehabilitation of the French and German mines promises to ease the shortages of this material in Europe in the near future. The output of Spanish mines is constantly reaching higher levels but these supplies have been entirely contracted for by European countries.

CHICAGO

Milorganite Withdrawn from Mixed Fertilizer Production. Protest from Fertilizer Manufacturers. Feed Market Still Tight

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, May 11, 1946.

The decision of the Milwaukee Sewerage Commission to discontinue selling Milorganite in bulk this coming season, and to sell it only in bags to their specialty trade, caused considerable concern among fertilizer manufacturers.

In view of the decided scarcity of organics, efforts are being made through the Department of Agriculture to exercise its influence with the Milwaukee Sewerage Commission to reverse their decision, or at least modify their sales policy. What success such action, if made, will have remains to be seen.

No appreciable change can be noted in the tight feed market. Ceilings are well maintained.

Ceiling prices are:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N) plus $7.50 per ton; blood, $5.53 ($6.72 per unit N) plus $7.50 per ton; dry rendered tankage, $1.25 per unit of protein, plus $7.50 per ton f.o.b. producing points.

PHILADELPHIA

Fertilizer Industry Asking Exemption from Freight Embargo. Possible Increase in Ceilings on Sulphate of Ammonia and Packing House By-Products

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, May 11, 1946.

The fertilizer material situation still remains unsettled and unsatisfactory. Sulphate of ammonia production, further reduced by the coal strike, cannot improve much, if any, by the temporary resumption of mining. It is said that it will require three weeks or more to again get under way after the coal supply becomes normal. The trade is disturbed by the fact that fertilizers have not been declared exempt from freight embargoes. And there was disappointment at not being able to get any information from local OPA officials in connection with the newspaper reports that effective May 13th the ceiling prices of corn, wheat, oats and other grains will be raised, and also fish scrap, meat scrap, tankage, etc.

Sulphate of Ammonia.—Short in deliveries on contracts, and production now practically nil due to coal strike. It is said an Advisory Committee is being formed by OPA in Washington to consider pricing this material, and an advance of $5.00 per ton is rumored. However, if the coal strike is not settled soon, there may be no sulphate.

Nitrate of Soda.—Demand continues in excess of available supply.

Fish Scrap.—Inquiry very active with practically no offerings. It is planned to send out a much larger fishing fleet this year and hope for a big catch. However, most of the scrap goes to the feeding trade.

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

Blood, Tankage, Bone.—Production is very limited due to reduced slaughtering. There is nowhere near enough to supply the demand, and consequently there is no market. A few shipments have moved on contracts.

Castor Pomace.—This remains in scant supply and no new business.

Phosphate Rock.—Shipments are made direct from production and no inventories possible. However, freight embargoes may be expected to interfere with deliveries. It is expected that increased production in North Africa will tend to relieve world shortage.

Superphosphate.—While deliveries have kept up fairly well with contract commitments, additional wants are left unsatisfied. And it may be expected that freight embargoes will affect further deliveries.

Potash.—Demand is heavy and, while shipments have been well up to schedule, it is feared they will now be hit by freight embargoes. New contract prices are expected now at any time, and possibly allocation.

CHARLESTON

Organic Materials Still Out of the Market. No Action on Potash Allocation to Date. Ammonia Chemicals Scarce

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, May 13, 1946.

Organics.—Milwaukee Sewerage Commission has announced that in future they will only sell their product, Milorganite, to the specialty trade and no longer in bulk to the fertilizer manufacturers. How the fertilizer manufacturers will cover the shortage of organics caused by this loss, no one knows. Protests have been made to Washington. Supplies of South American organics remain unobtainable.

Packinghouse Products.—These remain scarce and difficult to obtain even for the feed trade.

Potash.—There is still talk of allocation of supplies for next season but no action has been taken yet.

Sulphate of Ammonia.—The coal strike has further increased the severe shortage in the 1946 production.

Ammonium Nitrate.—Supplies of this material continue scarce with a very strong demand. The Commodity Credit Corporation is taking the bulk of it for shipment to Europe.

Phosphate Rock.—Decidedly no improvement in this situation, with plenty of orders which cannot be filled.

Fish Scrap.—Practically no offerings, as the producers continue to prepare their catches for the feed trade.

CASE HISTORY No. 5

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	100 lb. Burlap Bags	100 lb. Paper Bags
Bag cost per M.....	$296.20	$117.85
Bag cost per 100 lbs....	.296	.118
Labor cost per 100 lbs...	.125	.050
Total bag and labor cost per 100 lbs.....	.421	.168
Savings per 100 lbs. paper over fabric....		.253
Savings per ton, paper over fabric.....		5.06

DETAILS OF LABOR COSTS

Burlap Bags (with paper liners)

		Production per hour	Cost per 100 lbs.
1—Man filling at .82 per hour	$.82		
1—Man weighing at .82 per hour	.82		
1—Man sewing at .89 per hour	.89		
3—Men handling at .82 per hour	2.46		
6—Men in all	$4.99	4000 lbs.	.125

Multiwall Paper Valve Bags

1—Man filling and check-weighing at	.82		
3—Men handling at .82 per hour	2.46		
4—Men in all	$3.28	6500 lbs.	.050

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD ✓
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC ✓
FLUFFY ✓	LIGHT ✓
FREE-FLOWING	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute—with one operator.

HOW A ST. REGIS PACKAGING SYSTEM SAVES MONEY

for a manufacturer having limited* production

This fifth case history in a series of MULTIWALL success stories, relates the savings effected by a cocoa manufacturing concern through the introduction of St. Regis Multiwall Paper Valve Bags and Machine Packaging. Prior to the installation of the St. Regis Packaging System this company used various types of packages . . . barrels, fibre drums, and open-mouth burlap bags with paper liners. Since their initial trial, about one year ago, St. Regis Multiwall Paper Valve Bags have been found to be the most efficient and economical container for the purposes of this company.

REDUCED LABOR COSTS: Prior to adopting the St. Regis Packaging System this company was using one man to fill the bags, one to weigh them, and one to sew them closed. Now, one operator can fill and check-weigh 25 more 100-lb. bags per hour than the former three man crew . . . a labor saving of 66% in filling and weighing.

INCREASED PRODUCTION: The original three man filling crew and a three man handling crew were able to handle only 4000-lbs. of cocoa per hour. Since the installation of the St. Regis Packaging System one man is able to supply the three-man handling crew with 6500-lbs. of cocoa for shipment to customers . . . an increase in production of 62½% over the old system.

AN EXAMPLE IN PACKAGING ARITHMETIC

QUESTION:

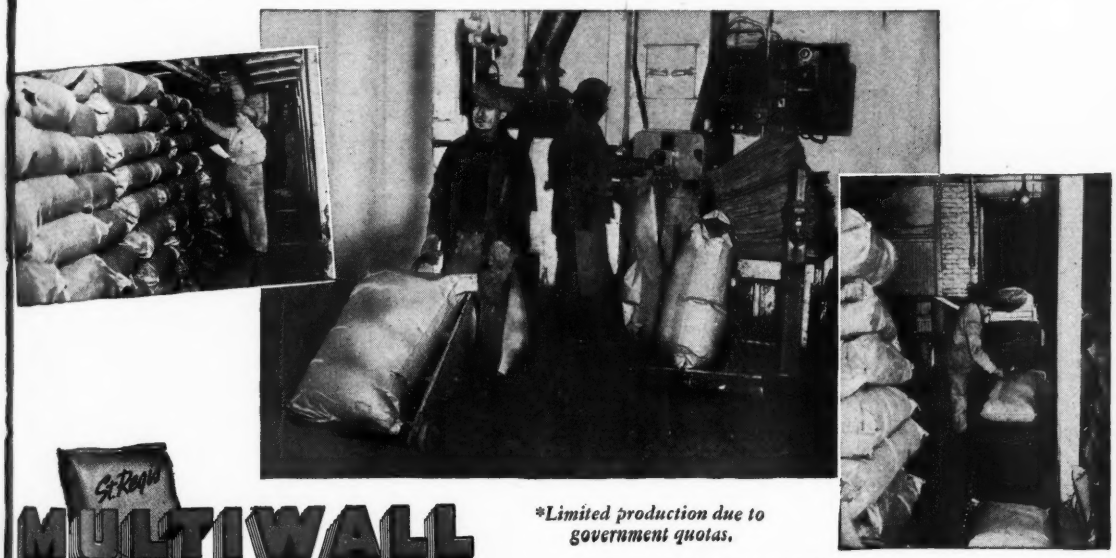
If it took three men one hour to fill, weigh and close 4000-lbs. of cocoa . . . how can one man fill, check-weigh and close 6500-lbs. in an hour?

ANSWER:

By changing over to a St. Regis Packaging System using a St. Regis Valve Bag Packer to fill Multiwall Paper Valve Bags.

REDUCED CONTAINER COSTS: In addition to the product protection afforded by multiple walls of kraft paper and the greater ease of handling Multiwalls, the customer discovered a saving of over 55% in bag cost by using Multiwall Paper Bags instead of Burlap Bags with paper liners.

The figures in this example prove conclusively that St. Regis Packaging Systems are just as applicable to small packaging operations as they are to operations that require batteries of high-speed packers. Call in a St. Regis field representative to advise you on the type packer that will best suit your needs.



MULTIWALL

Limited production due to government quotas.

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Without obligation, please send me full details regarding "Case History" No. 5, outlined above.

NAME_____

COMPANY_____

ADDRESS_____

Lion Oil Company Leases Ozark Mountain Ammonium Nitrate Plant

The Ozark Ordnance Works, near El Dorado, Arkansas, has been leased by the Lion Oil Company, of El Dorado, which has been operating the plant for the Government on a cost-plus-fixed-fee basis. The plant which is one of the largest and most economical producers of anhydrous ammonia and ammonium nitrate in the country, will devote future operations to the manufacture of ammonium nitrate for fertilizers and of other chemical synthetics, according to the announcement of T. H. Barton, president of the company.

Using only three raw materials—natural gas, air and water—the plant has an annual capacity of 165,000 tons of ammonium nitrate and 90,000 tons of anhydrous ammonia. The contract provides for the immediate construction at El Dorado of a new unit for the production of fertilizer grade ammonium nitrate, at a cost of approximately one million dollars. Pending construction of this unit, the company has leased, for temporary use, ammonium nitrate graining facilities at Minden, La., and at Texarkana, Texas. Ninety tank cars specially constructed for the transportation of anhydrous ammonia are included in the lease.

Possession of the El Dorado plant was delivered to the Lion Oil Company at noon on May 13th, without any interruption of operations. The terms of the lease cover an initial "construction period" of 12 months, plus a term of five years. The company has an option to renew for two additional periods of five years each. Rentals are based on the net value of sales, with sliding scale percentages applicable from year to year, and specified minimum annual rentals after the second year. The company has the option to purchase the plant at any time during the term of the lease.

Embargo Lifted

The embargo on shipments of fertilizers hauled by coal-burning locomotives, which was instituted on May 10th, was removed two days later when the miners agreed to resume coal production for a two-week period while negotiations with the operators were resumed. Prior to the start of the embargo the officers of the National Fertilizer Association made a strong plea for the exemption of fertilizers because of the seasonal necessity of moving this product during the next few

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SALTS

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122 East 42nd St. New York City

Pioneer Producers of Muriate in America

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MURIATE and SULPHATE of POTASH

Plant foods are urgently needed to grow the crops which feed our nation and our armed forces.

Our plant at Trona, Calif., is operating at capacity to provide supplies of these essential plant foods, and other materials needed in the national effort.

Manufacturers of Three Elephant Borax and Boric Acid

See page 27

Why you should come to

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CHEMICAL CONSTRUCTION CORP.

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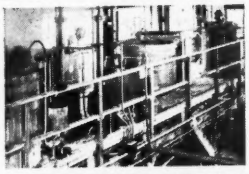

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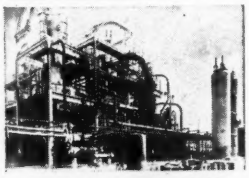

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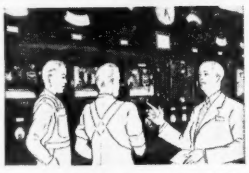

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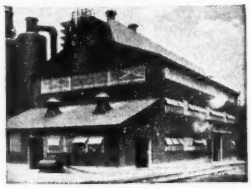

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For more than 30 years, the CHEMICO organization has specialized in the design of complete acid plants, acid concentrators, superphosphate plants, ammoniation apparatus, and fertilizer plants.

If your present plants are obsolete, inefficient, or run-down, if you need additional capacity, or if you need a complete new plant, the CHEMICO technologists and engineers are prepared to study your requirements, offer authoritative recommendations, and handle all the necessary work to be done.

More than 600 CHEMICO installations prove why you are sure of successful results when you come to CHEMICO for acid plants. Your inquiry is invited without obligation.

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CHEMICO SERVICE includes

1. *Analysis of individual plant conditions*
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CHEMICO PLANTS are PROFITABLE INVESTMENTS

weeks, but the situation became so critical that the Office of Defense Transportation felt that it could not make an exception in this case. It is hoped that the two-week negotiation will be productive of results and that coal will be available in steady supply not only for transportation but also for the production of sulphate of ammonia which has been seriously curtailed by the shut-down of many by-product coke ovens.

March Sulphate of Ammonia Production Increases

Production of sulphate of ammonia during March showed substantial gains over February according to the figures of the U. S. Bureau of Mines. This gain, whch amounted to 114 per cent, was due to the termination of the steel strike, which deprived the fertilizer industry of an estimated 124,000 tons of sulphate while it lasted. Sales during March again exceeded production and consequently stocks on hand at the end of the month had dropped to 20,000 tons.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH
PRODUCTION		
March, 1946	61,187	2,291
February, 1946	28,576	1,640
March, 1945	70,412	2,412
Jan.–March, 1946	133,286	6,005
Jan.–March, 1945	200,297	7,185
SALES		
March, 1946	64,203	2,199
February, 1946	29,192	1,594
March, 1945	82,932	2,504
Jan.–March, 1946	144,814	5,832
Jan.–March, 1945	234,797	6,796
STOCKS ON HAND		
March 31, 1946	20,610	668
February 28, 1946	23,651	727
March 31, 1945	34,452	767

Heyden Chemical Buys Interest in Trona Potash

B. R. Armour, president of the Heyden Chemical Corporation, New York, has announced to the stockholders of that company that the corporation had purchased 100,000 shares of the Class B stock of the American Potash and Chemical Corporation, which was recently sold by the Alien Property Custodian. This gives the Heyden Company 18.9 per cent of the voting stock and makes them the largest single stockholder of the potash company. Negotiations are under way with the directorate of the American Potash and Chemical Corporation for representation on the Board of Directors and active participation in the management.

Fertilizers Needed for Western Grains

Two nationally known agronomists urged the use of increased amounts of fertilizer in U. S. areas producing grain to meet urgent domestic and foreign demands. Their statements appear in the current issue of *The Fertilizer Review*, quarterly publication of the National Fertilizer Association.

In an article, "Is Nitrogen Going West?", Dr. W. A. Albrecht, Chairman, Soils Department, University of Missouri, declares that both the nation's bakers and farmers may well be reminded that hard wheat is "going West" for them unless they give greater attention to using nitrogen as fertilizer. Citing Kansas as an example, Dr. Albrecht notes the alarming increase in the rate by which fertility elements are being withdrawn from the soil in that state.

"Cannot such excessive removal of nitrogen and other soil fertility elements from the soil by these large cops be considered as casually

PULVERIZED
MASCOT
LIMESTONE
Trade Mark Registered

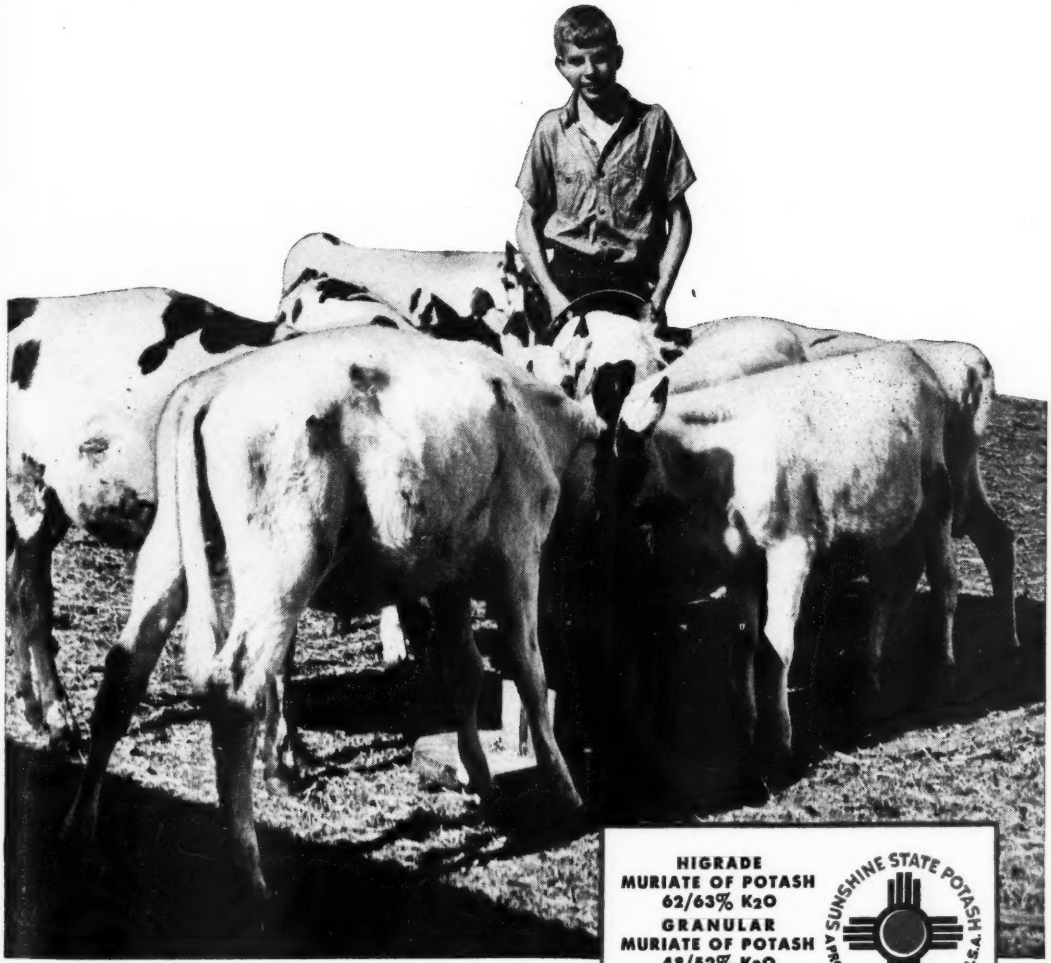
MAGNESIUM LIMESTONE
"It's a Dolomite"
American Limestone Company
Knoxville, Tenn.

TOMORROW'S BIG PRODUCERS . . .

Responsibility lies heavy on the shoulders of these youngsters. For tomorrow, it is they, and thousands like them, who must produce dairy products to feed the world. This lad is already learning from his father the improved methods of today's farming that mean bumper crops in field and dairy.

One of the most important of these methods is the use of your fertilizers, most of them compounded with potash. This vital soil nutrient increases pasture fertility . . . insures greater resistance to plant disease and drought.

Sunshine State Potash will aid these "big producers" of tomorrow just as it helps the farmers of today fill the food storehouses of the nation.



HIGRADE MURIATE OF POTASH 62/63% K_2O

GRANULAR MURIATE OF POTASH 48/52% K_2O

MANURE SALTS 22/26% K_2O

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.
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UNITED STATES POTASH COMPANY

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connected with the declining quality of the wheat?" asks Dr. Albrecht. "Is it not wiser that the bakers and farmers should recognize the dwindling soil fertility as a mutual problem rather than that they should fly at each other with accusations of the one attempting to maintain his own high volume of output regardless of having an equally high output go to the other? Would it not also be a wiser national policy in terms of food values in our 'staff of life' to think about keeping high the protein and ash contents of the wheat by fertilizing the soil than to agree to lower the standard figure of percentage for a product that all of us eat?"

In a second article, "Fertilizers—Their Place in Iowa's Corn Production," Dr. W. H. Pierre, Head, Agronomy Section, Iowa State College, states that under conditions of satisfactory farm prices, Iowa farmers could readily use a total of 250,000 tons of fertilizers annually on corn, their principle crop. "Since the amount used on corn at the present time is probably less than 40,000 tons annually, this would represent a 6- to 7-fold increase in consumption," declares Dr. Pierre. "It is evident from this analysis, therefore, that the Iowa farmer's interest in fertilizer for his No. 1 crop is justified, and that, given fair prices for his products he will likely increase his use of fertilizers on corn very materially during the next few years."

Fertilizers Produce Better Clover

Ample turnover of fertility built up by the use of lime and other fertilizers may make the difference between good stands of red clover and no clover at all, says A. W. Klemme of the University of Missouri College of Agriculture.

This is clearly shown by a long-time experiment on Sanborn Feld at Columbia. In the 20-year period from 1919 to 1938 parallel plots were cropped in a four-year rotation of corn, oats, wheat and red clover.

One plot was given 2 tons of limestone per acre every eight years, plus 200 pounds of a complete commercial fertilizer two years out of four in the rotation. The fertilizer was applied on both the wheat and the corn. The other plot received neither lime nor fertilizer.

On the limed and fertilized plot a good stand of red clover was obtained each round in the rotation and made an average yield of 3782 pounds of good clover hay per acre. On the adjacent plot, without lime or fertilizer, the average yield of clover hay was 1854 pounds per acre.

Seventeen years later in the same handling of these plots, in 1945, clover failed entirely on the untreated plot. On the limed and fertilized plot a good clover stand was obtained and has come on to make a heavy growth this year.

Colorado Must Rebuild Soil

Colorado faces the dire necessity of rebuilding its agricultural soil, H. S. Wilgus, acting director of the Colorado A. & M. College Experiment Station recently declared.

Throuhgout the war years and now in 1946, Colorado soil is being "mined" for maximum production, Wilgus explained, declaring that plant food cannot be taken from the soil indefinately without being replaced.

"The more a field produces, the more plant food is taken from it," he said. "This plant food is not 'manufactured' in the soil—it is there and when it is used up it is gone forever

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unless proper management and fertilizing puts it back.

"The several transmountain water diversion projects in the state only intensify this situation in the eastern part of the state. More water means bigger yields and therefore more plant food taken out of the soil.

"Eventually, unless research shows the way to remedy the situation, we will reach the point of diminishing returns even from more irrigation water.

"That our soils are getting less fertile is demonstrated by the fact that addition of commercial fertilizers—nitrogen, phosphorus, and potassium—in so many cases will give greatly increased yields.

"Agricultural research must point the way for best crop rotation, water utilization, and diversification to provide balance between crops and livestock units. We have a large store of knowledge in this field, but changing conditions constantly create the need for more information."

Fertilizer Demonstrations on Mississippi Corn

With more than 300 corn production demonstrations being conducted in 70 of the 82 counties in Mississippi, agricultural Extension workers and cooperating farmers and 4-H Club boys are attempting this year to add some 39 million dollars to the farm income by encouraging more corn producers to followed proved practices which produce larger yields, according to J. M. Weeks, Extension agronomist.

"Although experiments over the past 20 years have shown that nitrogen, in all sections of the state, returns 4 to 5 dollars worth of corn for each dollar spent for fertilizer for corn, not more than 10 per cent of the corn acreage usually receives the recommended fertilizer," Mr. Weeks said.

The corn production demonstrations being conducted by the Extension Service are using open-pollinated and leading hybrid varieties, adequate amounts of fertilizer, thick spacing, early planting and good cultivation.

"The average yield of 15 bushels can be increased to 25 to 30 bushels per acre if each acre is fertilized with 24 to 32 pounds of nitrogen, or the equivalent of 150 to 200 pounds of nitrate of soda. This would mean an increase of 26 million bushels of corn from the 2.6 million acres in prospect for this year.

"If approved practices are followed in Mississippi, the total corn production would be a record crop of 65 million bushels, worth about 97½ million dollars. This much corn and the 15 million bushels of oats a year would satisfy the grain requirements of the livestock now in the state."

Corn demonstrations conducted last year by 4-H Club boys at 109 points in the state revealed some important facts. Twenty-three top notchers in yield showed an average of 47 bushels per acre where no fertilizer was used. When 64 pounds of nitrogen was used to the acre, the yield was increased to 61 bushels per acre, or an increase of 14 bushels.

Better still, where the same nitrogen was used plus 40 pounds each of phosphoric acid and potash on hill soils, the yield was 78 bushels per acre. The additional phosphate and potash produced on an average, 17 bushels more corn to the acre. The complete fertilizer application produced 31 bushels more corn to the acre than the yield without fertilizer.

The highest production in the state last year was 130½ bushels per acre produced by Junior Merle Hester, 4-H Club boy of Iuka. Four other 4-H'ers topped 100 bushels per acre in the corn demonstration program.

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. . . . WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

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See Page 20

Analyze Apple Leaves to Detect Potassium

Experimental evidence has shown that a lack of sufficient potassium to maintain apple trees in optimum vigor can be detected through potassium analysis of the leaves, states I. W. Wander of the Department of Horticulture at the Ohio Agricultural Experiment Station.

After considerable trial work on this subject performed on apple trees at the Experiment Station, leaf samples were taken in 30 commercial orchards, located in several of the fruit producing regions of the state, during the period of July 30 to August 3, 1945. All samples were composite of leaves from several trees of the same age, the leaves being taken from the mid-portion of the current year's growth. At the time of sampling, notes were made of the variety, age of trees, previous and present fertilizer treatment, soil type and culture practiced. Any trees obviously weakened by winter injury or other cause were not samples.

The results indicated that out of 31 Stayman Winesap samples analyzed, only one proved to be low. Of 23 Rome Beauty samples, two showed low potassium contents and of 24 Delicious samples, one was possibly too low from the standpoint of good potassium nutrition.

Since there are so many variables to be considered, one year's data cannot be used as a basis of recommendation. However, it would appear that with several year's observations and determinations (under varying fruit loads, seasons, and other factors) as a background, reliable critical limits for the potassium content of leaves will be established and then can be used as a basis of fertilization and cultural recommendations.

GROW HEALTH INTO THE CROPS

(Continued from page 9)

Examples of Variations in Nutritive Value

Tomatoes—Dr. Jackson B. Hester, of the Campbell Soup Experiment Station, reporting (1) on his investigations of nutritive quality in tomatoes, has convincingly shown the relationship of soil fertility to quality. For example, he compares tomato plants grown on a soil deficient in magnesium and on one in good supply of this element, as shown in Table I. A similar relationship was shown for maganese and boron and the other usual plant foods.

TABLE I.
INFLUENCE OF MAGNESIUM UPON QUALITY OF TOMATOES

	Deficient Plant	Normal Plant
Yield in Tons	7.6	10.8
Color	C	A
Ascorbic acid (Vitamin C) parts per million of pulp	265	326
Sugars Grains per liter of pulp	28.4	48.2
Magnesium parts per million of pulp	14	44

Timothy Hay—Data from New York State reported by Dr. L. A. Maynard of the U. S. Nutritional Laboratory (Table II) show big differences obtained on the calcium and phosphorus content of timothy hay harvested at the same stage of maturity. The protein may be the same but differences in calcium and phosphorus range from 50 to 100 per cent.

TABLE II.
ANALYSES OF TIMOTHY HAY IN FULL BLOOM, AIR DRIED

Soil Type	Protein %	Calcium %	Phosphorus %
Cazenovia silt loam	5.54	0.239	0.203
Wooster silt loam	6.34	0.149	0.218
Honeoye silt loam	6.46	0.295	0.138
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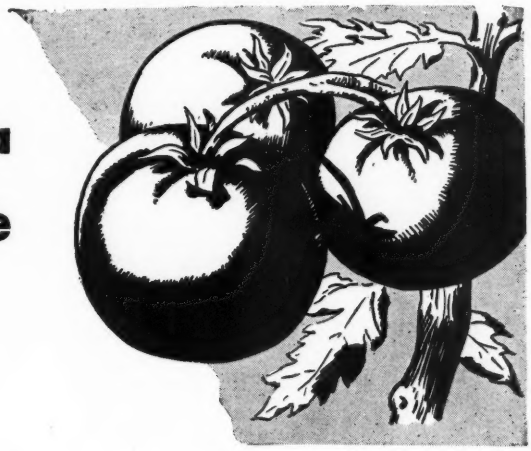
Tomatoes have a growing appetite for nitrogen

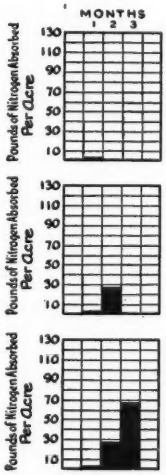


IN NEW JERSEY

During the 1st month, tomatoes absorb only about 3% of the total nitrogen they're going to need, according to New Jersey experiments.

In the 2nd month, the tomato plants begin to take hold. Still they use less than one-third of the nitrogen required for full growth.

But in the 3rd month, the tomato plants take up more than two-thirds of the nitrogen required for full growth and maturity.



Conclusion—Tomatoes need a nitrogen fertilizer that resists leaching for more than two months and then is ready to be taken up in large quantities during the last month before harvest.

Your fertilizer fits the crop when you use Urea Nitrogen

Urea nitrogen is completely available to plants, but is resistant to leaching owing to chemical reactions which take place in the soil. As a result, the nitrogen is available when required late in the growing season.

Du Pont UREA-AMMONIA LIQUORS provide an excellent source of urea nitrogen. They're low in cost, easy to handle, and produce quick-curing mixtures that store well and drill well. They also have a low acid reaction in the soil.

To meet the varying requirements of manufacturers, Du Pont supplies four UREA-AMMONIA LIQUORS and URAMON Fertilizer Compound. For additional information, write E. I. du Pont de Nemours & Co. (Inc.), Ammonia Department, Wilmington 98, Del.

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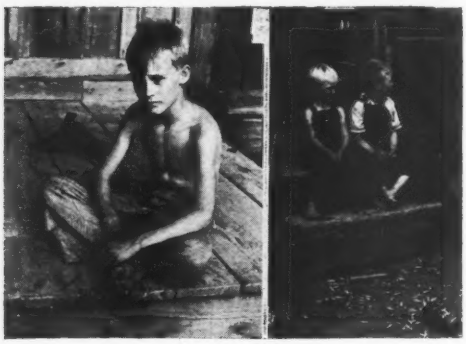
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Cabbage—Dr. R. C. Burrell and associates have reported (2) on varities of cabbage: ascorbic acid values in these varieties ranged from 0.48 to 1.81 milligrams per gram.

Other Research

The reports of a great many more investigators all point to the same results on every item of food found in the market. The North Dakota Station has shown that, by changes in the mineral nutrition of Thatcher wheat, it was possible to produce wheats with a protein content varying from 11 to 25 per cent.



Chalky-faced, dull looking, listless boys and girls

What does the mass of research data reveal? Are we to infer that most of the foods offered us are suspect as to nutritive value? Not at all. It does seem confusing when one studies the various conflicting reports. We do not by any means know all there is to know about all the nutrients needed by the body. Some have suggested we should take the natural foods as found in the market and supplement them with minerals and vitamins. In fact, some people seem to be doing this, now. This program looks good but I believe it is not the answer because we do not know all the essential factors in nourishing the body for normal health. As Noble Prize-winner Hopkins pointed out in 1906: "No animal can live on a mixture of pure protein, fat, and carbohydrate, and even when the necessary inorganic material is carefully supplied, the animal still cannot flourish. The animal body is adjusted to live upon plant tissues or other animals and these contain countless substances other than protein, carbohydrate, and fats."

Some have suggested that it might be practical to enrich certain specific foods in vitamins and minerals which are known to be deficient in many diets.

This has merit and it is actually being done with salt. Iodine is being added to salt for consumption by animals and man in areas known to be deficient in this element. Flour is being enriched in vitamin B; milk is being enriched in vitamin D.

The danger in this plan is that it may be carried too far. A false sense of security may be created. The important thing for us to do is to insist that our natural foods be grown so as to furnish a maximum amount of essential nutrients.

Perhaps my friend was right after all when he said he would eat his vitamins with a knife, fork and spoon. You and I would, too; but we want to be sure that the natural foods served us do actually contain all the essential nutrients. We all should do our part, therefore, in seeing to it that our farms grow health into the crop.

2. Food Research 5, 1940.

Ordnance Nitrogen Plants Sold

It is reported that the Government has completed arrangements for the sale of two nitrogen-producing ordnance plants to private owners. The Ozark Ordnance Works, at El Dorado, Arkansas, is being purchased by the Lion Oil Company, and the Jayhawk Ordnance Works at Pittsburg, Kansas, by the Military Chemical Works, Inc. Both plants have been operated by these companies, respectively, since V-J Day and are now producing about 30,000 tons of ammonium nitrate per month. Both plants operate with natural gas and therefore are not affected by the current coal and steel situations.

Another ordnance nitrogen plant at South Point, Ohio, with an annual capacity of 145,000 tons of nitrogen, is being operated by the Allied Chemical & Dye Corporation.

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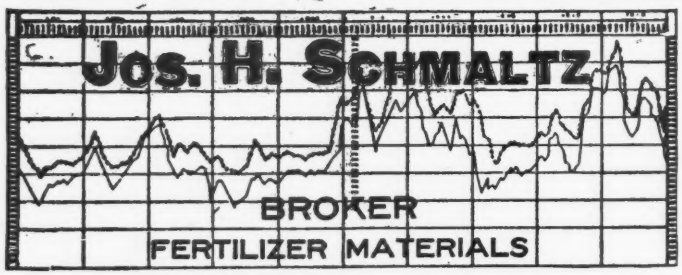

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